REMARKS

Reconsideration and allowance of the subject patent application are respectfully requested.

An Information Disclosure Statement is filed concurrently herewith.

As requested, an Abstract on a separate sheet has been provided. In addition, headings have been added to place the specification in a more traditional U.S. format.

Claim 48 has been amended to address the rejection under 35 U.S.C. Section 101. Claim 47 has been canceled without prejudice or disclaimer.

Applicants gratefully acknowledge the indication that claims 15 and 31 contain allowable subject matter. The subject matter of these allowable claims is presented in self-standing independent form in new claims 50 and 51, respectively.

While not acquiescing in the various rejections set forth in the office action, claim 1 has been amended based on the features of claims 18 and 41 which relate to tracking the boundary of the object using a first shape space, and then defining a second, different shape space for the interpretation of the movement of the object. The second shape space is adapted to select a desired attribute of the motion as specified in claim 42, this feature now also being present in amended claim 1.

In a non-limiting example embodiment described in the specification of the subject patent application, the desired attribute of the motion is the movement of the individual segments of the ventricle wall which correspond to those particular segments recognized and defined by clinicians and illustrated in Figure 8. Of course, the described method may be applied to objects other than internal bodily organs and to finding attributes of the motion other than the motion of specific predefined segments. Reference to "non-rigid contour" is made in the original description at page 3, line 22, and is exemplified by, but not limited to, a spline curve, e.g., a B-spline curve. Other ways of representing curves could, equally well, be used. The boundary is tracked through the sequence by calculating a shape-space representation with respect to a first shape space. In accordance with one aspect of the methodology described in present application, it is recognized that while one shape space might be very useful for tracking a boundary, it is not necessarily the most useful shape space for considering the meaning of the movement. Thus,

instead, a second shape space, an "interpretational shape space", is proposed. None of the documents identified in the office action discloses or suggests this.

In particular, Jacob et al. is the only cited prior art which relates to the use of shape space representations in tracking and was relied upon in the office action to reject claims 41-43. As noted above, "space-shape" features of claims 41 and 42 have now been incorporated into amended claim 1. Applicants believe the reliance in paragraph 6 of the office action on Jacob et al. to reject claims 41-43 constitutes an acknowledgement that neither Sheehan nor Chalana discloses the use of a shape space for tracking or interpretation. Consequently, Applicants believe that the various rejections based on Sheehan and Chalana are rendered moot by the amendments to claim 1.

In accordance with the method of claim 1, a different shape space is used for interpretation, which can represent the results of the tracking in a manner which may, for example, be more familiar and meaningful to the user. Thus in the illustrative, non-limiting case of tracking of the ventricle wall, a clinician is interested in the amount of movement in each of the segments illustrated in Figure 8 of the drawings of the subject patent application. These segments are not related in any way to the image analysis or tracking -- they are large segments of ventricle wall which have been defined by clinicians. By using a shape space which, by way of example, not limitation, produces a shape vector whose components correspond one-to-one to the amount of motion of these segments, the output of the method is of much more use to a clinician.

In Jacob et al. a shape space is calculated by performing a principal component analysis (PCA) of the movement. However, Jacob et al. clearly does not suggest interpreting a tracked boundary using a different shape space from the one used in the tracking process. It is clearly disclosed in Jacob et al. (and discussed in the introductory part of the present specification) that after the tracking is complete, it is the components of the tracking shape vector which are displayed (see Figure 5(a) to (f) of Jacob et al.). These components correspond to the principal components (or modes) of the motion illustrated in different ways in Figures 6 and 7 of Jacob et al. As discussed in the present application itself, each of these modes involves movement of many different parts of the ventricle wall. Thus the significance of the different components is very difficult for a clinician to assess. The portions of Jacob et al. referenced in the office action

in connection with claims 41-43 relate to tracking a boundary, and there is simply no disclosure or suggestion therein of using a second, different shape to interpret the tracked boundary.

For at least these reasons, Applicants respectfully submit that claim 1 is not disclosed or rendered obvious by the documents applied in the office action. Claims 2-39 depend from claim 1 and are believed to be allowable over the applied documents because of their dependencies and because of the additional patentable features recited therein.

New claim 49-56 have been added. The subject matter of these new claims is fully supported by the original disclosure and no new matter is added.

Claim 49 depends from claim 1 and is believed to be allowable because of this dependency and because of the additional patentable features recited therein.

As noted above, claims 50 and 51 respectively correspond to dependent claims 15 and 31, which were identified as being allowable.

Claim 52 is directed to a method of analysing a sequence of images of a deformable object in non-rigid motion. The method comprises modeling the boundary using a non-rigid contour; calculating a representation of movement of the contour through the sequence of images using a tracking space shape; and decomposing the calculated movement representation using an interpretational space shape that is different than the tracking space shape. As noted above, the applied documents do not disclose or suggest using different space shapes as claimed. Consequently, claim 52 and its dependent claims 53-56 are believed to be allowable.

Applicants submit that the pending claims are in condition for allowance, and early notice to that effect is respectfully requested.

Respectfully submitted,

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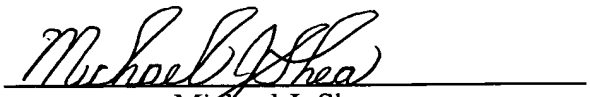
By: 

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